

## RIVERS AND FLOODS

[River and Flood Division, MERRILL BERNARD in charge]

By THOMAS S. SOUTHWICK

Precipitation during December 1938 was generally less than normal except in New England, Michigan, and the Southwestern States. Floods were minor and were confined to the extreme eastern and western parts of the country.

Moderate to heavy rains over the Coast Range in northern California and Oregon the first three days of the month caused high stages in that region. Flood stages were reached only on the Santiam River in Oregon and on the Eel River in northern California on the 3d. Flooding on the former was slight and no damage resulted; on the Eel River damage is estimated at \$19,000.

The abnormal snowfall in the last week of November over the Northeast, followed by above-normal temperatures and moderate rains caused threatening stages during the first week of December. Floods occurred on the Pemigewasset, Merrimack, and Connecticut Rivers in New England, the Susquehanna and Chenango Rivers in New York, and the Lackawaxen River in Pennsylvania during the period December 6 to 11. None of the floods was serious.

The longest period above flood stage was at Hartford, Conn., where the Connecticut River went above flood stage on the 7th and remained until December 13. The crest was on the 8th, with a stage of 19.1, or 3.1 feet above flood stage. The only damage reported was in the vicinity of Hartford and was confined to shipping which was delayed.

In the Susquehanna River basin there were two periods of high stages; from the 5th to the 8th and from the 10th to the 13th of December. The Susquehanna River went above flood stage during both periods, and during the latter rise, the Chenango River went above flood stage. Damage on the Susquehanna was reported as amounting to \$700, and on the Chenango, \$375. It is estimated that \$8,200 was saved because of the Weather Bureau's warnings.

The Lackawaxen River went 2 feet over flood stage on December 6th, when the melting of ice caused a rapid rise. No damage was reported.

Table of flood stages during December 1938

[All dates in December]

River and station	Flood stage	Above flood stages—dates		Crest		
		From—	To—	Stage	Date	
ATLANTIC SLOPE DRAINAGE						
	<i>Feet</i>			<i>Feet</i>		
Merrimack: Concord, N. H.-----	12	7	7	12.7	7	
Connecticut:						
South Newbury, Vt.-----	22	7	7	22.1	7	
Hartford, Conn.-----	16	7	13	19.1	8	
Lackawaxen: Hawley, Pa.-----	6	6	6	8.1	6	
Chenango:						
Sherburne, N. Y.-----	8	10	10	8.3	10	
Greene, N. Y.-----	8	10	11	8.6	11	
Susquehanna:						
Oneonta, N. Y.-----	12	{	6	8	15.3	6
			10	13	15.0	11
Vestal, N. Y.-----	12		6	8	15.6	6
			10	13	17.2	11
Cape Fear: Elizabethtown, N. C.-----	20	29	29	21.9	29	
Broad: Blairs, S. C.-----	14	28	28	14.6	28	
PACIFIC SLOPE DRAINAGE						
Eel: Fernbridge, Calif.-----	17.5	3	3	18.8	3	
<i>Columbia Basin</i>						
Santiam: Jefferson, Oreg.-----	10	3	3	10.3	3	

Locally heavy rains in the Carolinas on December 27 caused small rises on the Broad and Cape Fear Rivers on the 28th and 29th, respectively. There was no damage reported.

A report on the September 1938 flood on the Connecticut River will be in an early issue of the MONTHLY WEATHER REVIEW.

ESTIMATED FLOOD LOSSES DURING 1937<sup>1</sup>

The estimated flood losses in the United States during 1937 were the greatest of any year of which the Weather Bureau has records, and amounted to \$440,739,529 and 157 lives lost. Of this total, the greater part, \$417,685,557 and 137 deaths, was caused by the unprecedented flood in the Ohio and lower Mississippi Valleys during January and February and is the greatest loss of record from any one single major flood. A comparative table of flood losses for a few of the greatest individual floods of recent years follows:

Month and year	Region	Damage	Lives lost
January-February 1937	Ohio and lower Mississippi	\$417,685,557	137
Spring 1927	Mississippi Valley	284,117,631	313
March 1936	Eastern United States	270,000,000	107
March 1913	Ohio and lower Mississippi	154,000,000	467

<sup>1</sup> Incomplete.

The following tables are statements of estimated flood losses, and savings effected by Weather Bureau flood warnings in the year 1937.

Statement of estimated tangible flood losses during January-February flood in Ohio and lower Mississippi Basins

	Monetary loss <sup>1</sup>	Lives lost <sup>2</sup>
Ohio Basin:		
Illinois	\$17,400,000	10
Indiana	55,000,000	9
Ohio	88,300,000	10
Pennsylvania	4,700,000	0
West Virginia	21,000,000	6
Kentucky	219,800,000	22
Tennessee	5,000,000	8
Total	411,200,000	65
Lower Mississippi Basin	6,485,557	72
Grand total	417,685,557	137

<sup>1</sup> From data furnished by the Corps of Engineers, U. S. Army.<sup>2</sup> From vital statistics of the American Red Cross.

## ST. LAWRENCE DRAINAGE

## SANDUSKY RIVER IN OHIO

Tangible property totally or partially destroyed	\$20,000
Matured crops	50,000
Prospective crops	560,000
Livestock and other movable farm property	49,000
Suspension of business, including wages of employees	11,500
Total	690,500

## ATLANTIC SLOPE DRAINAGE

## TIOUGHNIAGA RIVER IN NEW YORK

Suspension of business, including wages of employees	600
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## CHENANGO RIVER IN NEW YORK

Tangible property, totally or partially destroyed	380
Matured crops	200
Suspension of business, including wages of employees	625

<sup>1</sup> Exclusive of losses in January-February flood in the Ohio and lower Mississippi Basins.

## JUNIATA RIVER IN PENNSYLVANIA

Tangible property, totally or partially destroyed.....	\$190, 000
Prospective crops.....	5, 000
Livestock and other movable farm property.....	40, 200
Suspension of business, including wages of employees.....	13, 400

## SUSQUEHANNA RIVER IN NEW YORK

Tangible property totally or partially destroyed.....	200
Matured crops.....	100
Suspension of business, including wages of employees.....	675

## SUSQUEHANNA RIVER IN PENNSYLVANIA

Tangible property totally or partially destroyed.....	595, 000
Prospective crops.....	50, 000

## PATUXENT RIVER AND CHESAPEAKE BAY

Tangible property totally or partially destroyed.....	33, 382
Matured crops.....	175
Prospective crops.....	4, 650
Livestock and other movable farm property.....	400

## POTOMAC RIVER

Tangible property totally or partially destroyed.....	1, 170, 335
Matured crops.....	13, 100
Prospective crops.....	133, 725
Livestock and other movable farm property.....	24, 390

## RAPPAHANNOCK AND YORK RIVERS IN VIRGINIA

Tangible property totally or partially destroyed.....	350, 363
Matured crops.....	2, 228
Prospective crops.....	54, 448
Livestock and other movable farm property.....	6, 000

## JAMES RIVER IN VIRGINIA

Tangible property totally or partially destroyed.....	502, 000
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## ROANOKE RIVER IN VIRGINIA AND NORTH CAROLINA

Tangible property totally or partially destroyed.....	49, 500
Matured crops.....	61, 150
Prospective crops.....	22, 500
Livestock and other movable farm property.....	2, 800
Suspension of business, including wages of employees.....	135, 650

## NEUSE RIVER IN NORTH CAROLINA

Tangible property totally or partially destroyed.....	3, 200
Matured crops.....	600
Prospective crops.....	5, 500
Livestock and other movable farm property.....	750
Suspension of business, including wages of employees.....	13, 000

## TAR RIVER IN NORTH CAROLINA

Tangible property totally or partially destroyed.....	1, 650
Matured crops.....	500
Prospective crops.....	4, 000
Livestock and other movable farm property.....	300
Suspension of business, including wages of employees.....	7, 000

## CAPE FEAR RIVER IN NORTH CAROLINA

Tangible property totally or partially destroyed.....	slight
Prospective crops.....	1, 000
Suspension of business, including wages of employees.....	8, 500

## PEEDEE RIVER IN SOUTH CAROLINA

Prospective crops.....	15, 000
Suspension of business, including wages of employees.....	14, 500

## SALUDA RIVER IN SOUTH CAROLINA

Tangible property totally or partially destroyed.....	25, 000
Matured crops.....	12, 500
Prospective crops.....	500

## CATAWBA-WATERBEE RIVERS IN SOUTH CAROLINA

Tangible property totally or partially destroyed.....	1, 000
Matured crops.....	3, 000
Prospective crops.....	5, 000
Suspension of business, including wages of employees.....	500

## BROAD RIVER IN SOUTH CAROLINA

Matured crops.....	\$300
Prospective crops.....	2, 700

## CONGAREE RIVER IN SOUTH CAROLINA

Prospective crops.....	1, 000
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## SANTEE RIVER IN SOUTH CAROLINA

Tangible property totally or partially destroyed.....	75
Prospective crops.....	140
Livestock and other movable farm property.....	400
Suspension of business, including wages of employees.....	18, 200

## SAVANNAH AND OGEECHEE RIVERS IN GEORGIA

Tangible property totally or partially destroyed.....	550
Livestock and other movable farm property.....	800
Suspension of business, including wages of employees.....	8, 900

## ALTAMAHA RIVER SYSTEM IN GEORGIA

Tangible property totally or partially destroyed.....	1, 250
Matured crops.....	1, 000
Prospective crops.....	19, 000
Livestock and other movable farm property.....	10, 800
Suspension of business, including wages of employees.....	28, 000

Total.....	3, 679, 291
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## EAST GULF OF MEXICO DRAINAGE

## APALACHICOLA RIVER IN FLORIDA

Tangible property totally or partially destroyed.....	8, 500
Prospective crops.....	1, 500
Suspension of business, including wages of employees.....	11, 000

## PEA RIVER IN ALABAMA

Tangible property totally or partially destroyed.....	7, 500
Matured crops.....	9, 000
Suspension of business, including wages of employees.....	3, 500

## CHOCTAWHATCHEE RIVER IN ALABAMA

Tangible property totally or partially destroyed.....	16, 000
Matured crops.....	31, 000
Prospective crops.....	7, 220
Suspension of business, including wages of employees.....	300

## CONNECUH RIVER IN ALABAMA

Tangible property totally or partially destroyed.....	8, 000
Matured crops.....	2, 100
Prospective crops.....	10, 000
Livestock and other movable farm property.....	1, 250
Suspension of business, including wages of employees.....	2, 200

## ALABAMA RIVER IN ALABAMA

Livestock and other movable farm property.....	3, 000
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## BLACK WARRIOR AND TOMBIGBEE RIVER IN ALABAMA

Tangible property totally or partially destroyed.....	17, 260
Prospective crops.....	97, 750
Livestock and other movable farm property.....	7, 900
Suspension of business, including wages of employees.....	65, 000

## PASCAGOULA RIVER IN MISSISSIPPI

Tangible property totally or partially destroyed.....	400
Prospective crops.....	100
Livestock and other movable farm property.....	400
Suspension of business, including wages of employees.....	9, 500

## PEARL RIVER IN MISSISSIPPI

Tangible property totally or partially destroyed.....	25, 000
Livestock and other movable farm property.....	2, 000
Suspension of business, including wages of employees.....	10, 200

Total.....	357, 580
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## UPPER MISSISSIPPI SYSTEM

## REDWOOD RIVER IN MINNESOTA

Tangible property totally or partially destroyed.....	\$6,000
Livestock and other movable farm property.....	1,000

## ROCK RIVER IN ILLINOIS AND WISCONSIN

Tangible property totally or partially destroyed.....	310,282
Matured crops.....	24,610
Prospective crops.....	297,260
Livestock.....	2,500
Suspension of business including wages of employees.....	90,163

## GALENA RIVER IN ILLINOIS

Tangible property totally or partially destroyed.....	150,000
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## MAQUOKETA AND WAPSIPPINCON RIVERS IN IOWA

Tangible property totally or partially destroyed.....	150,000
Livestock and other movable farm property.....	1,000
Suspension of business, including wages of employees.....	3,000

## IOWA AND CEDAR RIVERS IN IOWA

Tangible property totally or partially destroyed.....	10,000
Matured crops.....	300
Livestock and other movable farm property.....	1,900
Suspension of business, including wages of employees.....	1,100

## DES MOINES RIVER IN IOWA

Tangible property totally or partially destroyed.....	25,750
Matured crops.....	1,250
Prospective crops.....	6,450
Livestock and other movable farm property.....	6,300
Suspension of business, including wages of employees.....	5,340

## ILLINOIS RIVER IN ILLINOIS

Prospective crops.....	25,000
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## BOURBEUSE RIVER IN MISSOURI

Matured crops.....	8,000
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Total.....	1,127,205
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## MISSOURI BASIN

## BEAVERHEAD RIVER IN MONTANA

Tangible property totally or partially destroyed.....	4,000
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## YELLOWSTONE RIVER AT BILLINGS, MONT.

Total.....	750,000
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## CHEYENNE RIVER IN SOUTH DAKOTA

Tangible property totally or partially destroyed.....	140,535
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## BELLE FOURCHE AND WHITE RIVERS IN SOUTH DAKOTA

Tangible property totally or partially destroyed.....	66,300
Matured crops.....	15,000
Prospective crops.....	40,000

## BIG SIOUX RIVER IN IOWA

Tangible property totally or partially destroyed.....	78,000
Matured crops.....	1,500
Prospective crops.....	10,000
Livestock and other movable farm property.....	3,300
Suspension of business, including wages of employees.....	12,000

## FLOYD RIVER IN IOWA

Tangible property totally or partially destroyed.....	30,000
Prospective crops.....	14,000
Livestock and other movable farm property.....	500

## SOLOMON RIVER IN KANSAS

Tangible property totally or partially destroyed.....	1,000
Matured crops.....	1,000
Prospective crops.....	10,000

## REPUBLICAN RIVER IN KANSAS

Tangible property totally or partially destroyed.....	\$4,000
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## GRAND RIVER IN IOWA

Tangible property totally or partially destroyed.....	3,000
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## GRAND RIVER IN MISSOURI

Tangible property totally or partially destroyed.....	3,200
Prospective crops.....	4,000

## OSAGE RIVER IN MISSOURI

Tangible property totally or partially destroyed.....	5,000
Matured crops.....	20,500
Prospective crops.....	9,000
Livestock and other movable farm property.....	5,000
Suspension of business, including wages of employees.....	6,000

## MISSOURI RIVER

Tangible property totally or partially destroyed.....	3,000
Matured crops.....	21,500
Prospective crops.....	105,500
Livestock and other movable farm property.....	1,125

Total.....	1,367,960
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## OHIO BASIN

## ALLEGHENY RIVER IN PENNSYLVANIA

Tangible property totally or partially destroyed.....	240,000
Matured crops.....	1,000
Prospective crops.....	30,000
Livestock and other movable farm property.....	1,500
Suspension of business, including wages of employees.....	80,000

## MONONGAHELA RIVER IN PENNSYLVANIA

Tangible property totally or partially destroyed.....	163,500
Matured crops.....	50,000
Prospective crops.....	12,000
Suspension of business, including wages of employees.....	652,400

## MUSKINGUM RIVER IN OHIO

Tangible property totally or partially destroyed.....	135,000
Matured crops.....	57,000
Prospective crops.....	512,000
Livestock and other movable farm property.....	500
Suspension of business, including wages of employees.....	8,000

## LITTLE KANAWHA RIVER IN WEST VIRGINIA

Tangible property totally or partially destroyed.....	10,000
Matured crops.....	2,000
Prospective crops.....	7,000
Livestock and other movable farm property.....	1,000

## SCIOTO RIVER IN OHIO

Tangible property totally or partially destroyed.....	5,000
Prospective crops.....	95,000

## WEST FORK OF WHITE RIVER IN INDIANA

Matured crops.....	300
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## WHITE RIVER IN INDIANA

Matured crops.....	1,600
Prospective crops.....	5,000
Suspension of business, including wages of employees.....	500

## WABASH RIVER IN INDIANA

Tangible property totally or partially destroyed.....	200
Prospective crops.....	7,000
Suspension of business, including wages of employees.....	300

## FRENCH BROAD RIVER IN NORTH CAROLINA

Matured crops.....	1,000
Prospective crops.....	2,500

NORTH FORK OF HOLSTON RIVER IN TENNESSEE	
Matured crops.....	\$1, 850
OHIO RIVER (PITTSBURGH DISTRICT)	
Tangible property totally or partially destroyed.....	245, 000
Prospective crops.....	115, 000
Livestock and other movable farm property.....	2, 000
Suspension of business, including wages of employees.....	183, 326
OHIO RIVER (EVANSVILLE DISTRICT)	
Tangible property.....	2, 000
Prospective crops.....	65, 000
Livestock and other movable farm property.....	1, 000
Suspension of business, including wages of employees.....	2, 000
OHIO RIVER (CAIRO DISTRICT)	
Tangible property.....	1, 500
Prospective crops.....	31, 200
Livestock and other movable farm property.....	250
Suspension of business, including wages of employees.....	5, 450
Total.....	<u>2, 736, 876</u>

WHITE BASIN	
BLACK RIVER IN MISSOURI	
Tangible property.....	10, 200
Prospective crops.....	1, 000
Livestock and other movable farm property.....	2, 000
Suspension of business, including wages of employees.....	50, 150

BLACK RIVER IN ARKANSAS	
Prospective crops.....	1, 000

WHITE RIVER IN MISSOURI AND ARKANSAS	
Tangible property.....	26, 000
Prospective crops.....	23, 400
Livestock and other movable farm property.....	2, 000
Suspension of business, including wages of employees.....	31, 000
Total.....	<u>146, 750</u>

ARKANSAS BASIN	
CIMARRON RIVER IN OKLAHOMA	
Prospective crops.....	15, 000

NINNESCAH RIVER IN KANSAS	
Tangible property.....	150, 000
Matured crops.....	6, 000
Prospective crops.....	12, 000

NEOSHO RIVER IN KANSAS	
Tangible property totally or partially destroyed.....	16, 500
Matured crops.....	15, 000
Prospective crops.....	25, 000
Livestock or other movable farm property.....	10, 000

NORTH CANADIAN RIVER IN OKLAHOMA	
Tangible property totally or partially destroyed.....	253, 000
Matured crops.....	9, 800
Prospective crops.....	68, 600
Livestock and other movable farm property.....	1, 500
Suspension of business, including wages of employees.....	3, 200

CANADIAN RIVER IN NEW MEXICO	
Tangible property totally or partially destroyed.....	1, 500
Suspension of business, including wages of employees.....	5, 300

CANADIAN RIVER IN OKLAHOMA	
Tangible property totally or partially destroyed.....	520, 000
Matured crops.....	74, 100
Prospective crops.....	186, 500
Livestock and other movable farm property.....	3, 200
Suspension of business, including wages of employees.....	35, 000
Total.....	<u>1, 411, 200</u>

RED BASIN	
OUACHITA RIVER IN ARKANSAS	
Tangible property totally or partially destroyed.....	\$2, 500
Livestock and other movable farm property.....	2, 900
Suspension of business, including wages of employees.....	7, 700

SULPHUR RIVER IN TEXAS	
Tangible property, totally or partially destroyed.....	250
Suspension of business, including wages of employees.....	11, 500
Total.....	<u>24, 850</u>

LOWER MISSISSIPPI BASIN	
MISSISSIPPI RIVER	
Tangible property totally or partially destroyed.....	8, 000
Prospective crops.....	150, 000
Livestock and other movable farm property.....	4, 000
Suspension of business, including wages of employees.....	10, 000
Total.....	<u>172, 000</u>

WEST GULF OF MEXICO	
TRINITY RIVER IN TEXAS	
Livestock and other movable farm property.....	5, 000

PECOS RIVER IN NEW MEXICO	
Tangible property totally or partially destroyed.....	214, 000
Matured crops.....	65, 500
Prospective crops.....	700, 000
Livestock and other movable farm property.....	6, 500
Suspension of business, including wages of employees.....	1, 600

RIO GRANDE IN NEW MEXICO	
Tangible property totally or partially destroyed.....	310, 000
Matured crops.....	60, 000
Prospective crops.....	450, 000
Livestock and other movable farm property.....	10, 500
Suspension of business, including wages of employees.....	7, 000
Total.....	<u>1, 830, 100</u>

GULF OF CALIFORNIA DRAINAGE	
COLORADO BASIN	
GUNNISON RIVER IN COLORADO	
Tangible property totally or partially destroyed.....	108, 000
Matured crops.....	1, 000
Prospective crops.....	100, 000
Livestock and other movable farm property.....	2, 000

WILLIAMS RIVER IN ARIZONA	
Tangible property totally or partially destroyed.....	18, 000
Suspension of business, including wages of employees.....	135

GILA RIVER AND TRIBUTARIES IN ARIZONA	
Tangible property totally or partially destroyed.....	28, 750
Prospective crops.....	6, 500
Total.....	<u>264, 385</u>

PACIFIC SLOPE DRAINAGE	
SAN JOAQUIN RIVER IN CALIFORNIA	
Tangible property totally or partially destroyed.....	651, 650
Prospective crops.....	1, 180, 000
Suspension of business, including wages of employees.....	5, 000

SACRAMENTO RIVER IN CALIFORNIA	
Tangible property totally or partially destroyed.....	4, 980, 900
Matured crops.....	575, 350
Prospective crops.....	842, 000
Livestock and other movable farm property.....	773, 800
Suspension of business, including wages of employees.....	99, 200

## WILLAMETTE RIVER IN OREGON

Tangible property totally or partially destroyed.....	\$80, 300
Matured crops.....	7, 000
Prospective crops.....	12, 000
Livestock and other movable farm property.....	3, 075
Suspension of business, including wages of employees.....	35, 000
<b>Total.....</b>	<b>9, 245, 275</b>
Total, exclusive of Ohio-Mississippi flood.....	23, 053, 972
Total loss in Ohio River Basin, January-February.....	411, 200, 000
Total loss in lower Mississippi Basin, January-February.....	6, 485, 557
<b>Grand total.....</b>	<b>440, 739, 529</b>

*Estimated savings from flood warnings during 1937*

## ATLANTIC SLOPE DRAINAGE

Tioughnioga River in New York.....	\$1, 500
Chenango River in New York.....	3, 620
Susquehanna River.....	1, 500
Roanoke River.....	255, 000
Tar River in North Carolina.....	8, 000
Neuse River in North Carolina.....	26, 500
Cape Fear River in North Carolina.....	22, 500
Pee Dee River in South Carolina.....	36, 000
Saluda River in South Carolina.....	1, 500
Broad River in South Carolina.....	7, 000
Congaree River in South Carolina.....	3, 000
Catawba-Wateree River.....	20, 000
Santee River.....	26, 000
Savannah and Ogeechee Rivers.....	75, 000
Altamaha River.....	86, 000
<b>Total.....</b>	<b>573, 120</b>

## EAST GULF OF MEXICO DRAINAGE

Apalachicola River.....	4, 000
Conecuh River.....	2, 000
Alabama River.....	8, 000
Black Warrior-Tombigbee River.....	79, 000
Pascagoula River.....	15, 300
Pearl River.....	22, 500
<b>Total.....</b>	<b>130, 800</b>

## MISSISSIPPI SYSTEM

## UPPER MISSISSIPPI BASIN

Rock River in Illinois and Wisconsin.....	30, 000
Maquoketa and Wapsipinnicon Rivers in Iowa.....	5, 000
Iowa and Cedar Rivers in Iowa.....	2, 500
Des Moines River.....	117, 000
<b>Total.....</b>	<b>154, 500</b>

## MISSOURI BASIN

Big Sioux River.....	10, 000
Grand River in Missouri.....	27, 500
Osage River.....	10, 000
Missouri River.....	24, 000
<b>Total.....</b>	<b>71, 500</b>

## OHIO BASIN

Allegheny River.....	\$230, 000
Monongahela River.....	235, 000
Muskingum River.....	100, 000
West Fork of White River.....	64, 000
East Fork of White River.....	55, 000
White River in Indiana.....	558, 000
Wabash River.....	526, 000
Cumberland River.....	128, 600
French Broad River.....	1, 000
Tennessee River.....	53, 000
Ohio River and minor tributaries.....	55, 532, 850
<b>Total.....</b>	<b>57, 483, 450</b>

## WHITE BASIN

Black River in Missouri.....	6, 000
Black River in Arkansas.....	15, 000
White River in Arkansas.....	642, 000
<b>Total.....</b>	<b>663, 000</b>

## ARKANSAS BASIN

Cimarron River.....	12, 000
Ninnescah River in Kansas.....	5, 500
Neosho River.....	15, 000
North Canadian River.....	6, 000
Canadian River.....	105, 500
Petit Jean River.....	500
Arkansas River.....	10, 000
<b>Total.....</b>	<b>154, 500</b>

## RED BASIN

Ouachita River.....	135, 000
Sulphur River.....	7, 100
Red River.....	7, 500
<b>Total.....</b>	<b>149, 600</b>

## LOWER MISSISSIPPI BASIN

Mississippi River and minor tributaries.....	3, 021, 500
<b>Total for Mississippi system.....</b>	<b>61, 698, 050</b>

## WEST GULF OF MEXICO DRAINAGE

Trinity River.....	15, 000
Pecos River in New Mexico.....	155, 000
Rio Grande in New Mexico.....	165, 000
<b>Total.....</b>	<b>335, 000</b>

## PACIFIC SLOPE DRAINAGE

## SACRAMENTO BASIN

Sacramento River.....	2, 283, 550
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## COLUMBIA BASIN

Willamette River.....	35, 150
<b>Total Pacific Slope Drainage.....</b>	<b>2, 318, 700</b>

**Grand Total..... 65, 055, 670**

Flood losses and savings for 1938 will be published in an early issue.

## WEATHER ON THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, WILLIS E. HURD, acting in charge]

## NORTH ATLANTIC OCEAN, DECEMBER 1938

By H. C. HUNTER

*Atmospheric pressure.*—The pressure averages of December were below normal over more than half of the North Atlantic, though slightly above over some southeastern areas and from the vicinity of the Azores to waters near Newfoundland and eastern Canada. The northeastern portion of the ocean showed the largest deficiencies of pressure, but none of the selected stations had an

unusually large departure for a winter month, —0.16 inch being the greatest, at Julianehaab, Greenland, and Valencia, Ireland.

During the first 17 days pressure was for the most part below normal, and often much below, over northeastern and north-central regions. Thereafter for a few days, centering about the 20th, low pressure prevailed over a belt in lower latitudes from Bermuda to southwestern Europe.